"AUTOMATIC IDENTIFICATIONA AND RECOGNITION SYSTEM USING FACE IN A GROUP FOR STUDENT ATTENDANCE"

SYNOPSIS

Submitted By

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“AUTOMATIC IDENTIFICATIONA AND RECOGNITION SYSTEM USING FACE IN A GROUP FOR STUDENT ATTENDANCE”

1. Abstract:

The traditional method of class attendance for student monitoring is complex, sluggish, burdensome time consuming method. Attendance management of the student by traditional method had been challenge in the recent years due to large number of student are present for lecture and practical.

Automatic student attendance system is the new concept for class room attendance replacing with the conventional attendance marking method. This technique will very useful in monitoring the attendance which plays key factor in improving the learning of the student.

All developed and used automatic system includes finger print, smart card, digital signature and web based. In recent years, the problem of automatic attendance marking has been widely addressed through the use of standard biometric system. Visual attendance system is done through camera and computer without any other devices to identify the students. The student’s faces are used to mark the present student. The systems are really useful in monitoring and maintain record for teacher, student and administration. The number of students are increasing in educational institutions the requirement also increases and an automatic visual system become needful.

The proposed biometric based attendance system is intended to replace the manual model. The system contains attendance records of students in electronic files that containing details of absence or presence of a specific student from the enrolment System will automatically update the attendance on the server of the respective student on the university.

An automatic face based attendance system having multiple advantages monitor the number of student in the specific class room. Also provide the information for security purpose and information collected in image format is too use for legal purpose for the case of some offence or rules violation.

Another advantages of this system is to provide total number student count in specific subject, lecturer and in specific period of time. This system will be much more quicker and will save the time of teacher and also prevent from the fake attendance.

Keywords- Biometric, Student monitoring system, Class attendance

2. Introduction :

Human face reorganization is an important biometric verification system and has widely used in many applications such as video monitoring system, human computer interaction, door control system and network security. The automatic face reorganization system designing with the aim that to mark attendance of student in classroom automatically. This biometric system for class attendance consisting any digital Camera/CCTV camera and computer. The camera is fixed at the entrance of the class room or laboratory. Image is captured when student is entering in the hall. The camera is connected to computer. The captured images are processed by the computer and match with existing image database. If the captured image is matched with stored images the student is mark for attendance.

In proposed system the captured images perform the following steps involved in the processing phase. Image acquisition, image preprocessing, face detection, feature extraction and image recognition.

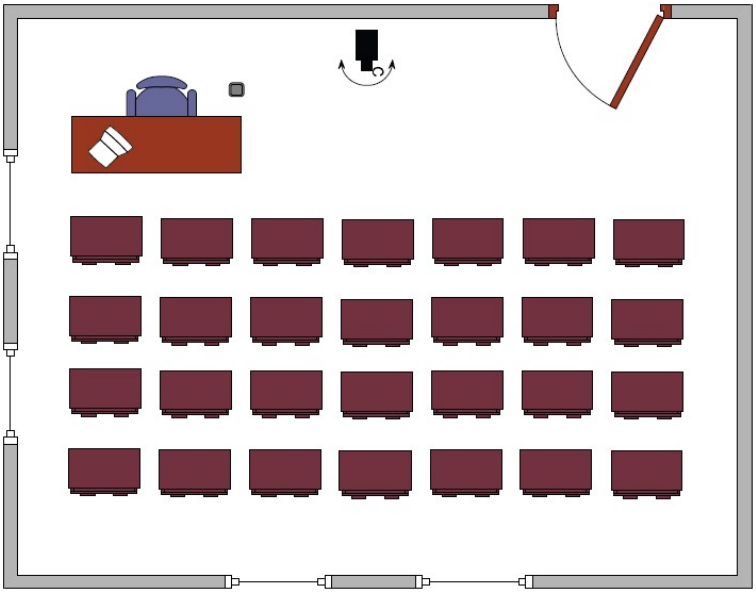

Fig.1. Snap of Class

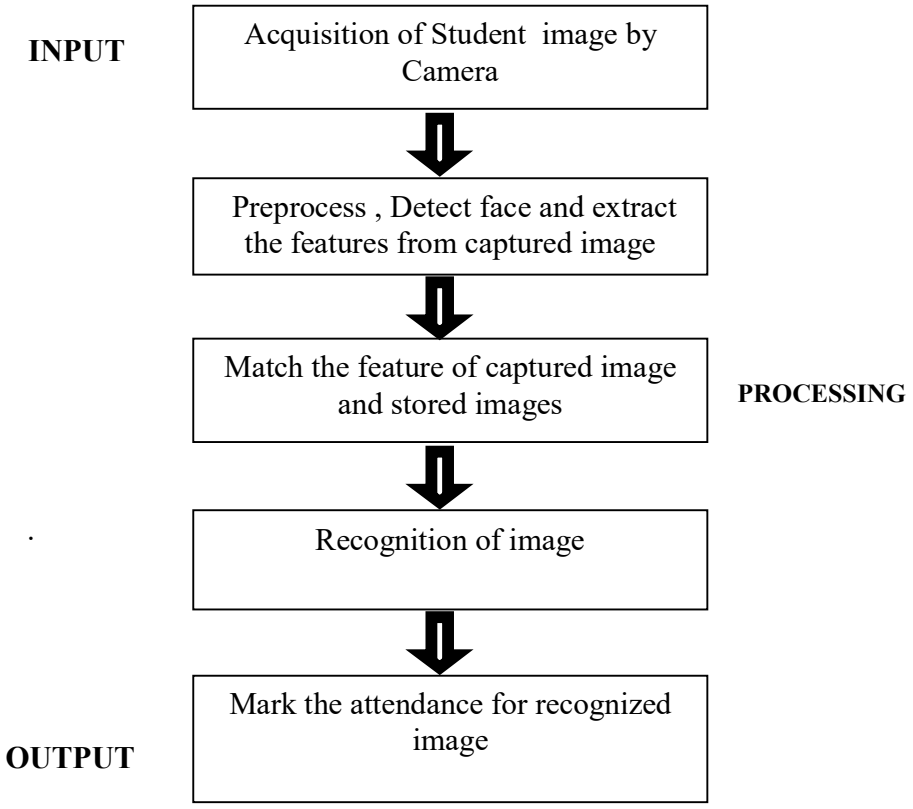
INPUT
Acquisition of Student image by Camera
Preprocess , Detect face and extract the features from captured image
Match the feature of captured image and stored images
PROCESSING
Recognition of image
Mark the attendance for recognized image
OUTPUT

Fig.2 Flowchart of proposed system

Image Input: To capture the student image. It is a any digital camera ,web camera or CC TV camera mounted at the entrance of the class room. When student enter in the class room his/her image is captured by camera and stored on camera connected laptop/desktop.

The captured image processed the following steps

Face Detection: This module will detect face of the captured object by camera . There are various techniques and algorithms are proposed for face detection method.

Feature Extraction: Feature extraction is one of the most important tasks. It is closed tied to pattern recognition. It is extraction of some useful features for human face analysis.

Face Recognition: Face recognition is the next step of feature extraction. Face recognition can be obtained by matching the features of captured image and images stored in the database at the time of student enrolment.

Attendance Marking: After successfully recognition of face of the student with stored database then marked for attendance for monitoring purpose.

3. Review of Literature :

Shireesha Chintalapati proposed a system base on face detection and recognition algorithms, automatically detects the student when he enters the class room his image is captured by the camera which is mounted at a distance from the entrance. For face detection Viola and Jones is used. The author collected 80 individuals with 20 images of each. Feature extraction is achieved by using Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA) algorithm. And for classification Support Vector Machine (SVM) and Baysian techniques are used. [1].

Mashhood Sajid, introduced a conceptual model model for automated attendance system through facial recognition. A camera is fixed in the class in the front, at such angle where picture of the whole class can be taken. Gaber Filter or Jets will be applied through every individual student facial Fiducial points like nose, eyes, lips are calculated. The measurement of facial features and matched with the stored database. If the match is done then student marked for attendance. The attendance taken three times in the lecture to maintain the attendance. [2].

O.Kainz, D.Cyblank, proposed a visual system for monitoring and counting attendance in the classroom. Students are automatically and indirectly monitor during classes and seminars. Objects tracked on hand tracking and movement anomalies, eye tracking and movement anomalies and suspicious objection recognition (Non Standard) based .The object detection and recognition using is to estimate the number of people in the room using face detection algorithms and face recognition algorithms to determine the actual identification of student. [3].

Priyanka Wagh and others proposed an architecture where a high definition camera fixed in the classroom at a suitable position that covered entire class room camera takes the picture of all student present in the class room. Viola and Jones algorithm is applied for face detection. For face recognition purpose Eigen Face method and Principle Component Analysis (PCA) are used. [4].

4. Statement of Problem:

Today, Face detection and recognition are very advanced in terms of computer authentication technology. The biometric based student attendance system is used to support the teacher for checking his/her students' attendance as well as it also help in students' academic monitoring in modern way. Face detection and recognition are considered to be the best and fastest method for biometric attendance system. They are secure to use and working without any preparation since the camera can direct capture the student faces, and then the report of attendant students will be produced immediately with no more effort.

5. Objectives of Research:

The face detection means to determine the position of the face in the captured image, the size, position and attitude of the process. It is a development direction and important application of pattern recognition, as a main technology in the information processing of human faces, and has been active research in the field of pattern recognition and computer human interaction.

The preliminary objective of the proposed research work as follows

- Capture the image of student while entering in the class.
- Preprocess the captured image in any image processing software
- Detect the face from captured image using general algorithm (PCA/LDA/ICA)
- Extract the feature from face detected image.
- Match the image with stored database of enrolled images.
- For training and testing Neural Network approach is used.
- Recognize the image.
- Mark the attendance of matched image in the student database record and monitor the attendance for student progress in learning.
- Solving these core problems will be required to move biometrics into mainstream

6. Methodology to be adopted:

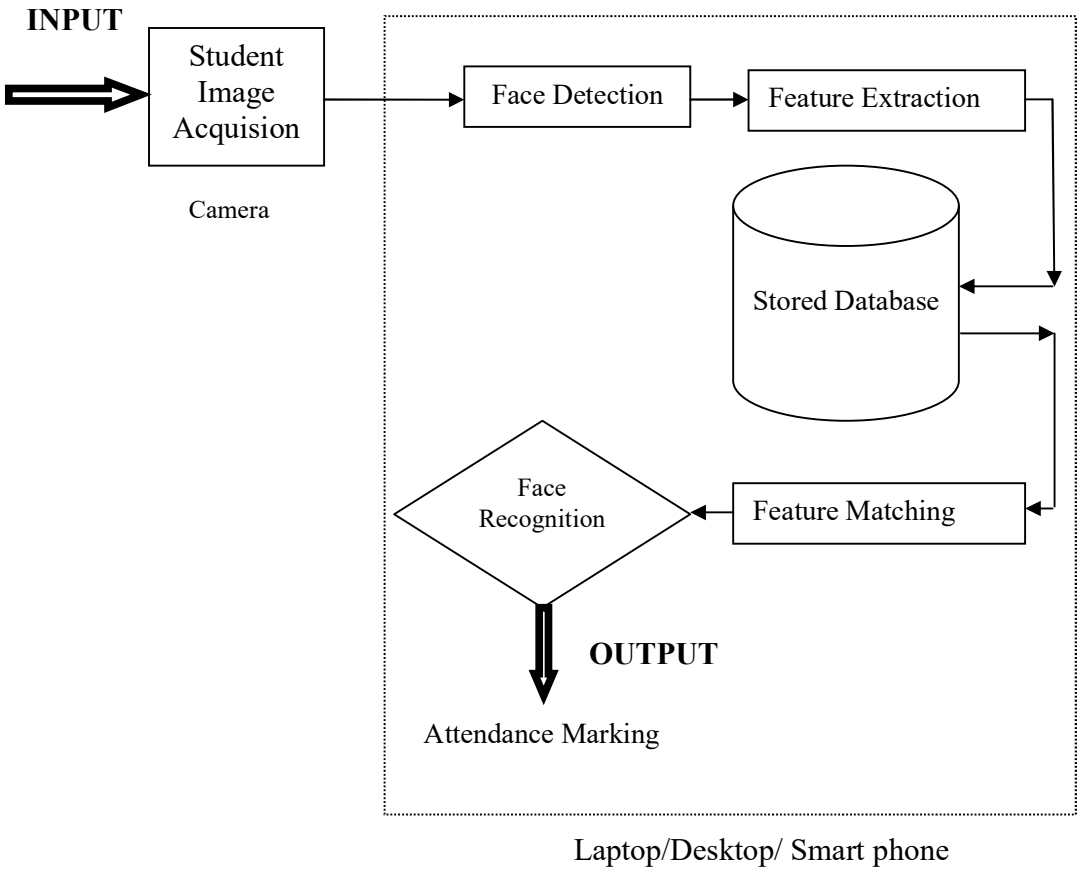

Fig. 3. Methodology structure of proposed system

Image acquision System: Image acquision is used to capture the student image. It is a any digital camera ,web camera or CC TV camera mounted at the entrance of the class room. When student enter in the class room his/her image is captured by camera and stored on camera connected laptop/desktop.

Face Detection: This module will detect face of the captured object by camera . There are various techniques and algorithms are proposed for face detection method.
Face detection techniques as follows.

- Face geometry
- Feature Invariant
- Machine Learning
- Viola and Jones

Feature Extraction: Feature extraction is one of the most important tasks. It is closed tied to pattern recognition. It is extraction of some useful features for human face analysis.

Feature extraction can be divided into two groups.

1) **Appearance based :**Which uses holistic texture features and is applied to either whole face region or specific regions in a face image. Appearance based method such as PCA and LDA has significance advanced.
2) **Feature based (structure) method**:. In this method feature of human face such as eyes, nose and mouth are first of all extracted and their location.

Face Recognition: Face recognition is the next step of feature extraction. Face recognition can be obtained by matching the features of captured image and images stored in the database at the time of student enrolment.

Neural Network Classifier :

A successful face recognition methodology depends heavily on the particular selection on feature used in pattern classifier. Neural network based face recognition is robust and has better performance. Back Propogation is the best known widely used learning algorithm in training multilayer perceptron. Back Propogation is a multilayer feed forward, superwised learning based on gradient descent learning rule.

Advantages of Neural Network:

Neural Network offer a number of advantages including requiring less formal statistical training, ability to implicitly detect complex non linear relationship between dependent and independent variables ability to detect all possible interaction between the predictor variable and the availability of multiple training algorithm.

To implement all of the above steps are MATLAB or any image processing software is used.

7. Importance of study/ Society application:

Important factor of improving the quality of education is having students attend classes regularly monitoring. Traditionally students are stimulated to attend classes using attendance points which at the end of a year constitute a part of a students' final grade. However, traditionally this presents additional effort from the teacher, who must make sure to correctly mark attending students, which at the same time wastes a considerable amount of time from the teaching process. Furthermore it can get much more complicated if one has to deal with large groups of students.

- This system will save the time of teacher in theory class or practical laboratory.
- It will useful in monitoring the student attendance record for teacher as well as administration for the purpose of quality of education.
- It prevent from the fake attendance.
- It will also help in security.

8. Proposed work Plan/ Formulation and Structure of Study:

- Data collection
- Preprocessing of data
- Experimental works
- Implementation and result analysis
- Conclusion

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